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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,701	06/25/2003	Duane Koehler	200309612-1	3416

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EXAMINER	
PHAM, HAI CHI	

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/603,701	KOEHLER ET AL.	
	Examiner	Art Unit	
	Hai C Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,8-10,13-17,19-23,25-28,30-32,34-37,39-44,48 and 49* is/are rejected.

7)☒ Claim(s) *2,7,11,12,18,24,29,33,38 and 45-47* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *06/25/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-6, 8-10, 13-17, 19-23, 25-28, 30-32, 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al. (U.S. 6,474,772) in view of Fujiwara (Pub. No. U.S. 2003/0058332).

Kawamura et al., an acknowledged prior art, discloses a method for determining thermal turn-on energy of a printhead comprising:

- (referring to claims 1, 10, 16, 27, 36) firing the printhead at a first firing frequency (F_t) over an initial range of print energies to detect an approximate range of print energies in which the turn-on energy is located (see Fig. 4A and associated discussions).
- (referring to claims 3, 19-21) wherein firing the printhead at the first firing frequency over the initial range of print energies comprises passing a first plurality of substantially constant voltage electric signals through heater resistors within the printhead and varying a pulse width (W_t) of the first plurality of substantially constant voltage electric signals within a first range of pulse widths (col. 3, line 58 to col. 4, line 6),

- (referring to claim 4) varying the pulse width of the first plurality of substantially constant voltage electric signals comprises reducing a pulse width of each successive signal in the first plurality of substantially constant voltage electric signals (col. 3, line 58 to col. 4, line 6),
- (referring to claims 5, 13, 30) varying the pulse width of the first plurality of substantially constant voltage electric signals comprises reducing a pulse width of each successive signal in the first plurality of substantially constant voltage electric signals by a first amount (col. 3, line 58 to col. 4, line 6),
- (referring to claim 6) wherein when firing the printhead at the first firing frequency, different print energies are obtained by varying pulse width of an electric signal passed through heater resistors within the printhead (col. 3, line 58 to col. 4, line 6),
- (referring to claims 8, 14, 17, 25, 28, 34) wherein the approximate range of print energies in which the turn-on energy is located is detected by monitoring temperature of the printhead (using the temperature sensor 21) in order to approximate a range of pulse widths where a minimum temperature of the printhead occurs (Fig. 4B) (col. 3, line 67 to col. 4, line 6),
- (referring to claims 9, 15, 26, 35) wherein the value for the turn-on energy is determined by monitoring temperature of the printhead in order to determine a pulse width where a minimum temperature of the printhead occurs (col. 3, line 67 to col. 4, line 6).

However, Kawamura et al. fails to teach the second stage of the algorithm for determining thermal turn-on energy of the printhead.

Fujiwara clearly discloses the claimed algorithm in general as shown in Fig. 1, which includes the first detecting step with the input values of the laser intensities being selected over an initial range to obtain a first approximate range of optimum laser intensity, and the second detecting step in which the optimum input value obtained in the first detecting step is further selected at finer intervals smaller than the first interval until the desired value is obtained. While Fujiwara does not disclose application of the algorithm to turn-on energy adjustment by firing the printhead at predetermined firing frequency, the disclosure is reasonably pertinent to the claimed invention since it solves the same problem of determining the optimal value of a variable for a given constant variable in the same manner as Applicants. The purpose of implementation of the algorithm is to reduce the length of an optimization process, as suggested in the Background and Summary of the Fujiwara disclosure. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the algorithm disclosed by Fujiwara for the purpose of reducing the length of optimization in the determination of the turn-on energy. Setting of a higher second firing frequency as well as reducing the pulse width with a second smaller amount are suggested since the tested value is suggested to always be within the narrower range being tested in the second iteration step.

3. Claims 37, 39-44, 48-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al. in view of Fujiwara and Walker et al. (U.S. 6,244,682).

Kawamura et al. in view of Fujiwara discloses all the basic limitations of the claimed invention (see rejection in paragraph 2 above) except for the storage media.

Walker et al., another acknowledged prior art, discloses a method and apparatus for determining turn-on energy for a printhead and suggests that the calibration functions can be implemented as firmware or software instructions for a conventional microprocessor or ASIC (col. 1, lines 28-40).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to implement the program codes suitable for carrying out the determination of the turn-on energy for a printhead in the modified device of Kawamura et al. as suggested by Walker et al. The motivation for doing so would have been to automate a would-be complex process.

Allowable Subject Matter

4. Claims 2, 7, 11-12, 18, 24, 29, 33, 38 and 45-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of claims 2, 11, 18, 29,

38 and 45, is the inclusion therein, in combination as currently claimed, of the limitation "wherein the second firing frequency is more than twice the first firing frequency", which is not found taught the prior art of record considered alone or in combination.

The primary reason for the indication of the allowability of claims 7, 12, 24 and 33, is the inclusion therein, in combination as currently claimed, of the limitation "firing ink at additional print frequencies in order to more accurately determine the value for the turn-on energy of the printhead", which is not found taught the prior art of record considered alone or in combination.

Claims 46 and 47 are allowable because they are directly/indirectly dependent from claim 45 above.

Pertinent Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wade et al. (U.S. 5,428,376) discloses a thermal turn-on energy test for an ink jet printer comprising firing the printhead with a series of firing pulses at a predetermined firing frequency, incrementally decreasing the firing pulse width while keeping the supply voltage constant, and sampling the temperature of the printhead for different ink firing pulse energies applied to the heater resistors.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HAI PHAM
PRIMARY EXAMINER
August 18, 2004